

Time:

45-60 minutes

Explore:

material properties, engineering design process (define a problem, imagine and plan, create, test, and improve)

Materials:

Gather up a bunch of household items that kids can use to make costumes. The kids will be dressing up an orange or ball that will represent Ruff in their show.

Here are some suggestions:

- ☐ Plastic bags
- ☐ Sponge
- ☐ Paper (toilet paper, paper towels)
- ☐ Balloons
- ☐ Tin foil
- ☐ Mop or string
- ☐ Cardboard
- ☐ Cloth (like old t-shirts)
- ☐ Tape
- ☐ Marker

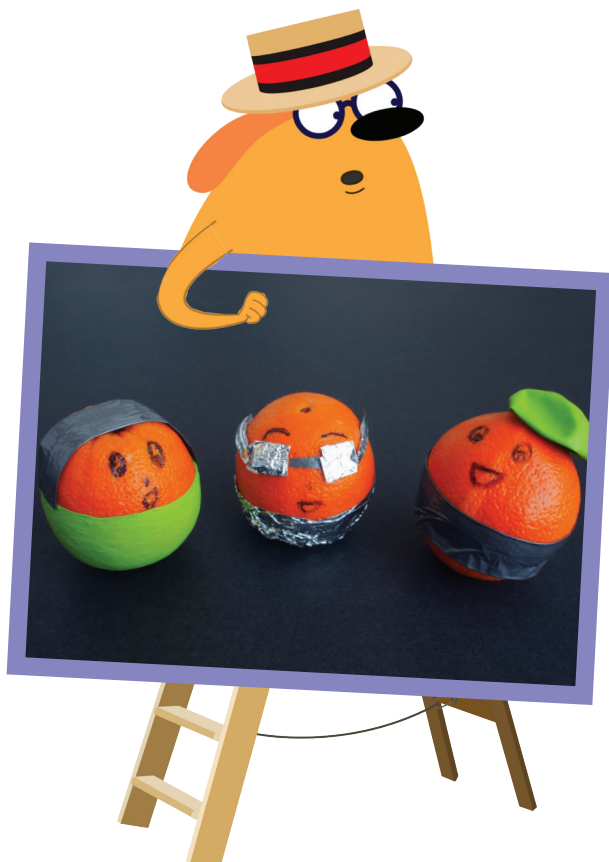
You'll also need:

- ☐ Orange or tennis ball (to be Ruff) for each player
- ☐ Scissors
- ☐ Flashlight (if you're doing the "Party Time" scene)
- ☐ Plastic basin, sink, or plastic sheet (for any scenes with water)

Showtime

Kid Description: Grab a grown-up and some friends to create costumes for Ruff's next show! You'll use materials found around your home to dress-up a mini Ruff.

This activity is for two or more players, and you should have about one grown-up for every two children who are participating. If you are a big group, try having all the children work on the same one or two scenes. You can play this activity indoors or outdoors.



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Wonder

- ★ Lay out all the materials on the floor or a table.
- ★ Pass around the materials one at a time, and ask kids to use their senses to explore each one.
 - **Ask:** How does this material look?
 - **Ask:** How does this material feel?
 - **Ask:** How does this material sound?

Define a Problem

- ★ Ask kids to choose one of the Ruff scenes provided below, a story from the videos, or make up their own new Ruff adventure!
- ★ You could also assign one scene to each kid.
- ★ For each scene, ask the kids what problem Ruff needs their help to solve.



- ★ Here are some ideas (for the “Party Time” scene):

Scene 1 – Rainy Day: Ruff is stuck outside in the rain! Dress Ruff in something **WATERPROOF** so he won’t get wet.

Scene 2 – Big Spill: Ruff spilled his smoothie and now he has to clean up a big mess! Dress Ruff in something that **SOAKS UP** liquid.

Scene 3 – Party Time: Ruff is having a disco dance party. Dress Ruff in something **SHINY** the light will bounce off.

Scene 4 – Nap Time: Ruff wants to take a nap. Dress him in something **SOFT** so he’ll be cozy.

Scene 5 – Create your own!: Make up your own story about Ruff! Ask the kids to think about what kind of clothes Ruff would need to wear in their story, and what kind of materials they have available to create his costume.



Imagine and Plan

- ★ Once they’ve chosen a scene, ask the kids what kinds of materials they predict will be best for their costume:

Scene 1 – Rainy Day

- **Ask:** Which material might be good to keep him dry?

Scene 2 – Big Spill

- **Ask:** Which material will soak up liquid?

Scene 3 – Party Time

- **Ask:** Which material will let light bounce off of it?

Scene 4 – Nap Time

- **Ask:** Which material feels the softest?

Scene 5 – Create your own!

- **Ask:** Let’s make up a story for Ruff that uses these materials. Think about what kind of clothes he’d need to wear in the story.

- ★ Write down the kids’ predictions on their printouts.

- **Ask:** Based on your exploration of the materials, which ones do you predict will be the best ones for Ruff’s costume?

- ★ Next, ask kids to plan out their costume designs on the printout.

- **Ask:** On the printout, draw what you want your costume to look like. Document all the materials you’re going to use.

Create

- ★ It’s time to create the costume!
- ★ Ask kids to pick out their building materials, using the list on their printout.
- ★ Have kids dress up their mini Ruff, and ask them questions about whether the costume does what it needs.
 - **Ask:** Do you predict Ruff’s costume will do what it needs to do? Why or why not?
- ★ Encourage kids to draw a face on their mini Ruff, if they want to!
- ★ You may need to help kids with the tape or scissors as they create their costumes.



Test

- ★ It’s time to find out if the kids picked the best materials for Ruff’s costume!
- ★ If you have a smartphone or tablet, try using it to record the tests.
 - **Explain:** It’s time to test your costumes, to see if you picked out the best material for Ruff.

★ Kids should run their own tests while you offer them support.

★ The kids can act out the scene as part of their testing, OR just run the test by itself.

Scene 1 – Rainy Day: Pour water on the costume. Observe if the water soaks through or slides off.

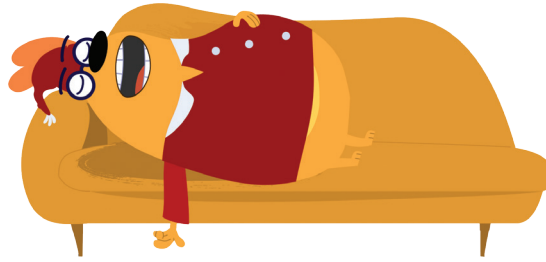
- **Ask:** If the costume is waterproof, the water will slide off. What happened to the costume? Did the water slide off or soak in?

Scene 2 – Big Spill: Pour water on the costume. Observe if the water soaks up or slides off.

- **Ask:** If the water soaks in to the costume, that means it will be able to soak up Ruff's mess. What happened to the costume? Did the water slide off or soak in?

Scene 3 – Party Time: Shine a flashlight on the costume. Observe if the light absorbs or reflects.

- **Ask:** If the light reflects off of the costume, that means it is shiny enough for the disco dance party. What happened to the costume? Did the light reflect off it?

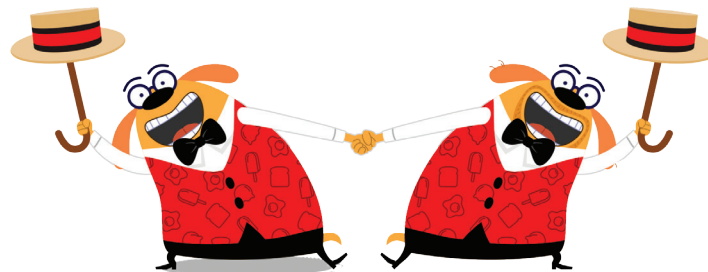


Scene 4 – Nap Time: Feel Ruff's outfit. Observe if it's soft.

- **Ask:** If the costume is soft, that means Ruff will be able to take his nap. How does his costume feel? Does it feel soft? Can you think of other things that are soft (example: blanket, pillow); is this similar to how those things feel?

Scene 5 – Create your own!: Create and run a test based on your original story. When you're creating your test, think about how can you test whether the material in Ruff's costume did its job.

- **Ask:** What happened to the costume? Did it work or not?



Reflect

★ After each test, ask kids what happened and write down their answers on the printout.

- **Ask:** What happened when you tested?
- **Ask:** Was your prediction right? Why do you think those materials worked?
- **Ask:** Was your prediction wrong? Why do you think those materials didn't work?



Improve

★ Ask kids to improve their costume designs based on the results of their tests.

- **Ask:** How would you improve your costume, so it passes the test? Spend a few minutes changing your design, then let's run the test and see if you get a different result!



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Activity

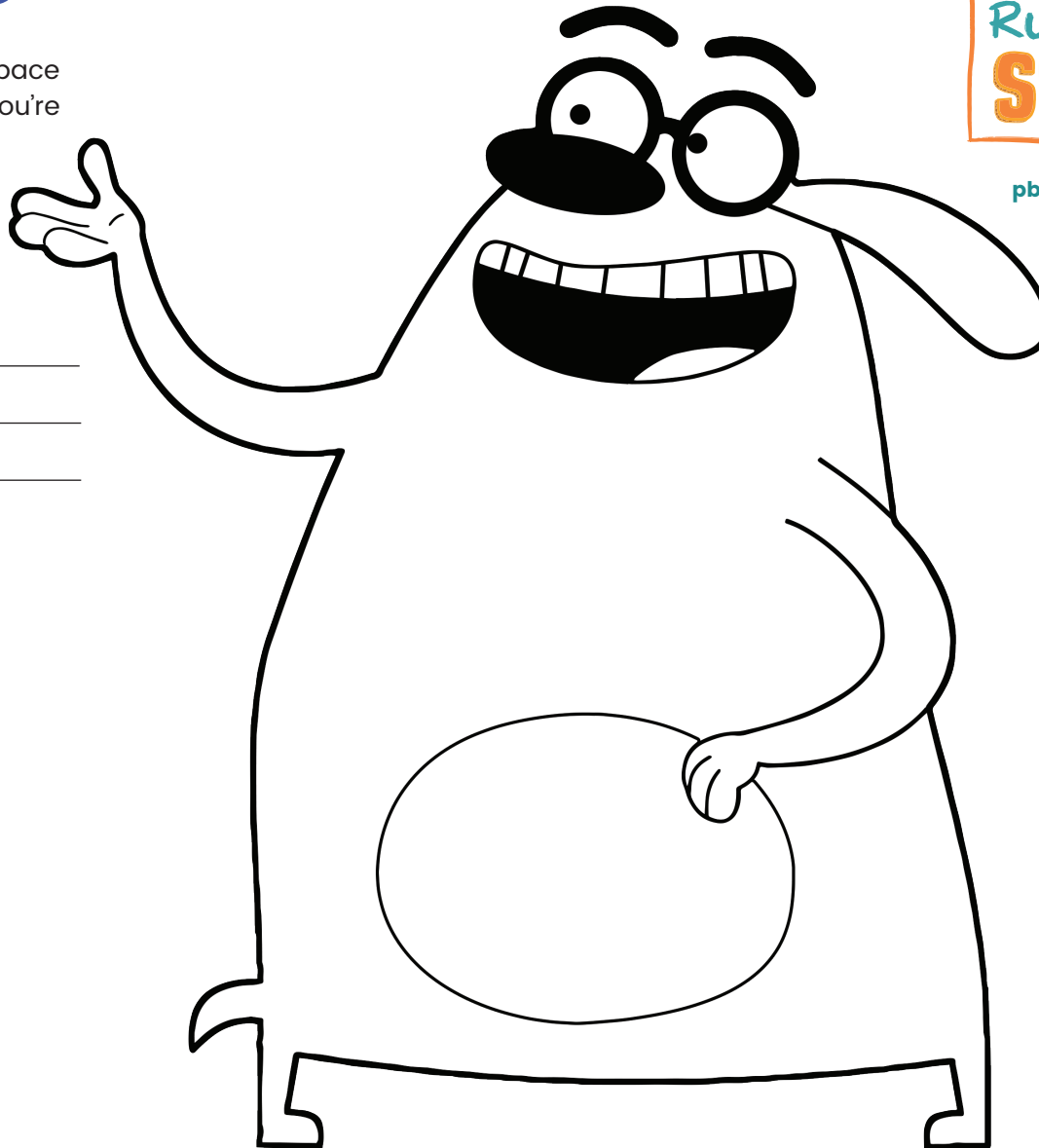
Showtime

Draw your costume for Ruff in the space provided, and list which materials you're going to use to make it.

Scene:

Materials:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____



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